

FOREST STAND IMPROVEMENT

(Acre)
Code 666

Natural Resources Conservation Service
Conservation Practice Standard

I. Definition

The manipulation of species composition, stand structure, and stocking by cutting or killing selected trees and understory vegetation.

II. Purposes

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- To increase the quantity and quality of forest products, e.g., sawtimber, veneer, wood fiber, poles, pilings, maple syrup, naval stores, nuts, and fruits.
- To harvest forest products.
- To initiate forest stand regeneration.
- To reduce the potential of damage from wildfire, pests, and moisture stress by the removal or treatment of diseased, damaged, or low quality timber.
- To restore natural plant communities.
- To achieve a desired understory plant community.
- To improve aesthetic, recreation, and open space values.
- To improve wildlife habitat.
- To improve water conservation and yield.
- To achieve a desired level of crop tree stocking and density.
- To increase carbon storage in selected crop trees.

III. Conditions Where Practice Applies

All forest lands where improvement of forest resources is needed.

In areas where trees are grown and the quality of the final product and the potential of the site justify the cost.

In areas where both softwood and/or hardwood improvement practices are beneficial.

Under those conditions where competing vegetation is of such density to inhibit growth and vigor of desirable target species.

This practice may be applied as part of a resource management system to support the increased growth of trees on sites suitable for production of sawtimber and veneer logs through crop tree release and release of desirable seedlings. Consult local foresters for further guidance.

IV. Federal, State, and Local Laws

Users of this standard should be aware of potentially applicable federal, state, and local laws, rules, regulations, or permit requirements governing Forest Stand Improvement. This standard does not contain the text of federal, state, or local laws.

V. Criteria

A. General Criteria

The harvest-regeneration strategy will be identified for all planned forest improvement harvesting:

- Uneven-aged management systems (single-tree selection, group selection, coppice selection)
- Even-aged management (clear-cut, seed-tree, shelterwood, coppice)

The extent or size of the treatment area shall achieve the intended purpose.

Preferred tree and understory species are identified and retained to achieve all planned purposes.

Spacing, density, size class, number, and amounts of trees and understory species to be retained will follow established guidelines for the intended purposes.

Identify species targeted for long term enhancement on the site.

Invasive species will be controlled in favor of native vegetation.

Species targeted for improvement will be suitable for the purpose identified in the plan.

Stocking guidelines shall contain stocking in terms of basal area, spacing or trees per acre by species and size class distribution.

The method, felling direction, and timing of tree cutting for harvesting shall facilitate efficient and safe tree removal and protect sensitive areas such as vernal pools, riparian zones, cultural resources, and structures.

Forest stand improvement activities shall be performed to minimize soil erosion, compaction, rutting, and damage to remaining vegetation and hydrologic conditions.

Timing of treatment will vary by site, species, and age. Trees can be cut at any time during the year; however, applying the treatment in the fall and winter reduces danger of insect, disease, and mechanical damage to residuals due to felling. See state and local laws for seasonal cutting restrictions (e.g. oak species due to oak wilt).

Slash and debris left on the site after treatment will not present an unacceptable fire, safety, environmental, or pest hazard. Such remaining material will not interfere with the intended purpose or other management activities.

The method of treatment will not adversely reduce the growth and vigor of the target residual trees for the intended purpose.

B. Criteria for Understory Release

Release should be limited to soils with a Site Index of 55 or more at age 50, if timber production is the primary purpose.

Select from 60 to 150 crop trees per acre, or in the case of under planting or natural regeneration with an overstory, release of the entire stand may be applicable.

VI. Considerations

Additional recommendations relating to design that may enhance the use of, or avoid problems with, this practice but are not required to ensure its basic conservation functions are as follows.

- A. Silvicultural objectives and harvest-regeneration strategies may change over time and may be limited by prior management.
- B. Successful regeneration of desirable species is usually dependent upon timely application of forest stand improvement and other practices, e.g., prescribed burning, site preparation, tree and shrub establishment, prescribed grazing, and use exclusion.
- C. The extent, timing, size of treatment area, or the intensity of the practice should be adjusted to minimize cumulative effects (onsite and offsite), e.g., hydrologic and stream alteration, habitat fragmentation, nutrient cycling, bio-diversity, and visual resources.
- D. Potential landowner and operator liability should be assessed before forest stand improvement activities begin.
- E. The practice should be timed to minimize disturbance of seasonal wildlife activities.
- F. In areas where there is a concern for the spread of pathogens, cutting tools should be disinfected to prevent the spread of disease.
- G. In areas where heavy brush or weeds may cause severe competition for moisture and nutrients, it may be necessary to reduce competing vegetation by:
 - Mechanical release of target residual trees by hand.
 - Strip tillage with a disk or similar implement on slopes of 6% or less. For slopes greater than 6%, perform treatment on the contour or use chemical treatment methods.
 - Chemical treatment to release tree seedlings from heavy brush. This method is desirable for sites where disturbing the soil surface may lead to excessive erosion.
- H. Consider wildlife food and cover needs when making modifications to forest composition and tree spacing.
- I. In areas of dense regeneration, girdling is a viable option vs. felling.
- J. Best Management Practice considerations are applicable to species in areas being considered for conversion to longer lived species.

- K. Consider retention of selected dead and dying trees, including down material, to enhance wildlife habitat values.
- L. Landowners should secure a written contract with any service provider that specifically describes the extent of activity, duration of activity, responsibilities of each party and amount and timing of payments for services provided.
- M. Consider environmental effects of harvest on threatened and endangered species and natural areas where present.

VII. Plans and Specifications

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

VIII. Operation and Maintenance

An operation and maintenance plan shall be developed that is consistent with the purpose of this practice, intended life of the components, and criteria for design. The plan shall include but is not limited to:

- A. Periodic inspections during treatment activities are necessary to ensure that objectives are achieved and resource damage is minimized. Follow-up and ongoing management activities will be needed to obtain desired results.
- B. Periodically inspect plant condition and take additional actions as necessary.
- C. To insure adequate survival of released target species; it may be necessary to control competing vegetation on a continual basis.

IX. References

Smith, David Martyn, 1962. The Practice of Silviculture. 578 pp.

U.S. Department of Agriculture, Forest Service, 1965. Silvics of Forest Trees of the United States, Agriculture Handbook No. 271. 762 pp.

Stoddard, Charles H., 1968. Essentials of Forestry Practice. 362 pp.